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REMARKS

During the phone interview, the Examiner indicated adding a sheet showing a hemispherical non rotatable member to overcome the objections to the drawings in the Office Action. Applicants propose adding sheet no. 7, FIG. 10 showing a non-rotatable member to overcome the objection as discussed. Applicants submit that this added FIG. 10 does not add new matter because the Application discloses "a non-rotatable member of a hemispherical shape". (Application, pg. 9, lines 3-4) FIG. 10 shows exactly what is disclosed a non-rotatable hemispherical member.

Applicants noticed that there was no description of FIGs. 8 and 9 included with the filed application in the description of the Drawings. Applicants propose amending the Description of the Drawings to include a description of existing FIGs. 8 and 9 and added FIG. 10.

Applicants propose amending the Specification to include a reference to added FIG. 10.

Applicants propose amending the claims as discussed during the phone interview to place the case in condition for allowance.

The attorney of record invites the Examiner to contact him at (310) 553-7977 to discuss the proposed amendments.

Dated: March 4, 2004

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PAPER FEEDER OF SHEET-FEED PRESS
[Maiyoshiki Insatsuki No Kami Okuri Sochi]

Yasuo Sone

UNITED STATES PATENT AND TRADEMARK OFFICE
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Specification /1*

1. Title of the Invention: PAPER FEEDER OF SHEET-FEED PRESS

2. Claim

1. A paper feed of a sheet-feed press characterized by the fact that in a paper feeder of a sheet-feed press that regulates the positions of papers being sequentially fed by an endless tape by a front contact installed in front of a register port and a horizontal needle installed at the side and feeds the papers to the main body of the press, it is equipped with a lift holder that is coupled with a side shaft for generating a periodic motion in the above-mentioned horizontal needle, a brush arm of which one end is supported in a freely sliding way and the other end is operated by the above-mentioned lift holder, and a brush roller that is freely rotatably installed at said brush arm and presses the papers between the brush roller and the above-mentioned endless tape.

3. Detailed explanation of the invention

(Industrial application field)

The present invention pertains to a sheet-feed type

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*Numbers in the margin indicate pagination in the foreign text.

press. In particular, it pertains to a paper feeder that accurately prevents the rebound of papers due to a front contact by a brush roller for pressing the papers by interlocking with the periodic motion of a horizontal needle. (Prior art)

In a paper feeder of a sheet-feed type press, as shown in Figure 4, papers 1 prepared as a pile are sequentially fed onto an endless tape 3 of a feeder port 2 and fed in the direction of a register port 6 while being pressed by a paper press roller 4 and a brush roller 5 installed above the feeder port 2.

A front contact 7 for regulating the front of the papers 1 is installed in front of the register port 6, and a horizontal needle 8 for a horizontal regulation is installed at the side. The papers 1 are position-regulated by these front contact 7 and horizontal needle 8, gripped by a swing gripper 9, and fed to a transferrer 10 of the main body of the press.

On the other hand, in the position regulation, first, the front end of the papers 1 contacts with the front contact 7 and is pulled to the side in the advance direction (in the direction
perpendicular to the figure in Figure 4) by the horizontal needle /2
8. In addition, a so-called pulling bar type horizontal needle 8 consisting of a rail member 11 being reciprocated in the direction perpendicular to the figure and a press roller

14 being contacted and separated to and from the papers 1 by the oscillating motion of a side shaft 13 coupled by a bracket 12 is shown in Figure 4, and other types are also similar.

At that time, the brush roller 5 is disposed at the rear end of the papers 1 so that it may be nearly contacted and pressed in accordance with the paper size. The reason for this is that the rebound at a time of collision of the papers 1 with the front contact 7 is prevented by the brush roller 5 and the pull to the side by the horizontal needle 8 is not hindered. Also, instead of the brush roller 5, a press roller without a directivity may also be similarly disposed.

(Problems to be solved by the invention)

On the other hand, as the papers 1 are fed at higher speed, especially for a high-speed printing, the inertia of the papers 1 is increased, and for this reason, when the front end of the papers 1 collides with the front contact 7, the cushion is also increased. Along with it, the rebounding force is also increased, and the rebound prevention function is not sufficient by only disposing the brush roller 5 very closely to the rear end of the papers 1. For this reason, an intended precision is lowered.

However, for preventing the rebound, if the papers 1 are pressed by disposing the brush roller 5 at the middle of the papers 1, the papers 1 are distorted when the horizontal needle 8 carries out a pulling motion. Thus, it is not allowable.

The present invention solves the above-mentioned problems, and its purpose is to obtain a good intended precision by accurately preventing the rebound of papers at a time of a high-speed printing.

(Means to solve the problems)

In order to achieve the above-mentioned purpose, the paper feed of a sheet-feed press of the present invention is equipped with a lift holder that is coupled with a side shaft for generating a periodic motion in a horizontal needle, a brush arm of which one end is supported in a freely sliding way and the other end is operated by the above-mentioned lift holder, and a brush roller that is freely rotatably installed at said brush arm and presses the papers between the brush roller and the above-mentioned endless tape.

(Operation)

According to the device of the present invention, although the brush roller itself exists at almost the middle part of papers stopped by the front contact, the brush roller is operated by the lift holder in which the brush arm for supporting the brush roller is interlocked with the side shaft, only when the horizontal needle is not operated.

For this reason, no trouble is generated by the pulling motion of the horizontal needle, and the rebound of the papers due to the front contact is accurately prevented, so that an intended precision in a high-speed printing can be improved.

(Application example)

Next, referring to the figures, an application example of the present invention is explained in detail.

Figure 1 is a side view showing an application example of the paper feeder of the present invention. Figure 2 is an enlarged diagram showing the main parts. Figures 3(a) and (b) are operational illustrative diagrams. The same symbols is given to the same member as that of the above-mentioned Figure 4, and its explanation is omitted.

Since the device of the present invention utilizes a periodic motion of a horizontal needle 8, first, the horizontal needle 8 is explained. The horizontal needle 8, as has already been mentioned, consists of a rail member 11 being reciprocated perpendicularly to the advance direction of papers 1 (that is, in the direction perpendicular to the figure) and a press roller 14 being contacted and separated to and from the papers 1 by the oscillating motion of a side shaft 3 coupled by a bracket 12. When the rail member 11 and the press roller 14 sandwich the papers 1, the papers 1 are pulled to the side in the advance direction by the rail member 11 and horizontally regulated.

Both the reciprocating motion of the rail member 11 and the oscillating motion of the side shaft 3 depend on the driving force from the main body of the press, and needless to say, the rail member 11 and the side shaft 3 are timely driven in accordance with the feed speed of the papers 1.

The driving system of the side shaft 13 in direct

relation to the device of the present invention is explained. Both ends of the side shaft 13 are supported in a freely oscillating way by
a side frame 15 of the press. A press roller 14 is coupled with /3
the side shaft 13 via the bracket 12, and one end of a cam arm 16 is also coupled. A cam roller 17 is elastically contacted with a cam 19 by a spring 18, and with the rotation of the cam 19 by the power from the main body of the press, the side shaft 13 is periodically oscillated in the arrow direction.

On the other hand, an appropriate number of lift holder 20 is divided and fixed to the side shaft 13 inserted in the direction perpendicular to the advance direction of the papers 1, and part of the lift holders 20 becomes an adjustable contact part 21 by a forward and backward adjustable screw and can be contacted and separated to and from a reception part 23 of the brush arm 22.

A support shaft 25 is inserted in the horizontal direction between support members 24 vertically installed at both sides of the advance path of the papers 1, and the same number of arm bracket 26 as that of the lift holders 20 is divided and fixed to appropriate positions of the support shaft 25. The other end of the arm bracket 26 is branched into a fork shape, and one end of the brush arm 22 is coupled in a freely sliding way with an arm pin 27. At almost the center part of the brush arm 22 cranked in approximately L shape, a brush roller 29 is freely rotatably installed by a

pin 28. Furthermore, the other end becomes the reception part 23 to and from which the adjustable contact pat 21 of the lift holder 20 as mentioned above.

Since a pressurization tendency to the direction (that is, the lower side) of the endless tape 3 is given to the brush roller 29, a press spring 30 is interposed between the position-fixed arm bracket 26 and the freely oscillating brush arm 22. Also, an adjusting bolt 31 to adjust the pressure is spirally installed at the end of the brush arm 22, and if the tip of the adjusting bolt 31 is contacted with the end surface of the arm bracket 26, the pressure of the press spring 30 is immediately exerted no longer.

Also, the number of brush roller 29 is appropriate, and its arrangement position is optional as long as it is at the vicinity of the side shaft 31. As shown in the figure, if it is positioned in accordance with the tip part of the endless tape 3, the rebound of the papers 1 can be effectively prevented by the cooperation with the force for advancing the papers 1 forward by the endless tape 3.

Also, a unidirectional clutch is installed between the brush roller 29 and the pin 28, and if the brush roller 29 is rotated only clockwise in Figure 1, it is not rolled backward by the rebound of the papers 1, which is more appropriate.

Next, the operation is explained. The papers 1 are sequentially fed by the endless tape 3, and until the front end collides with the front contact 7 in front of the register

port 6 and regulated, as shown in Figure 3(a), the adjustable contact part 21 of the lift holder 20 fixed to the side shaft 13 and the reception part 23 of the freely oscillating brush arm 22 round the arm pin 27 are separated from each other. At that time, the brush roller 29 installed in a freely rotating way at the brush arm 22 sandwiches the middle part of the papers 1 between the brush roller and the endless tape 3, so that the rebound is not generated when the papers 1 collide with the front contact 7. In addition, since the endless tape 3 always advances the papers 1 forward, it precisely contacts the papers 1 with the front contact 7 by the cooperation with the brush roller 29.

Next, if the side shaft 13, as shown in Figure 3(b) is rotated counterclockwise, the adjustable contact part 21 of the lift holder 20 pushes the reception part 23 of the brush arm 22 against the force of the press spring 30, so that the brush roller 29 is also separated from the papers 1. Thereby, it is operated no longer immediately. At that time, the press roller 14 of the horizontal needle 8 coupled with the side shaft 13 contacts with the upper surface of the papers 1 and horizontally regulated with the cooperation of the rail member 11.

(Effects of the invention)

According to the paper feeder of the present invention, utilizing the periodic motion of the side shaft for operating the horizontal needle, the brush roller is disposed at the

position where the middle part of the papers can be pressed. Thus, the rebound of the papers due to the front contact is precisely prevented, and the horizontal regulation is not hindered. Thereby, an intended precision of the papers at a time of a high-speed printing can be improved much more.

4. Brief description of the figures /4

Figure 1 is a side view showing an application example of the paper feeder of the present invention. Figure 2 is an enlarged diagram showing the main parts. Figures 3(a) and (b) are operational illustrative diagrams. Figure 4 is a side view showing a prior art.

1 Paper

3 Endless tape

7 Front contact

8 Horizontal needle

11 Rail member

13 Side shaft

14 Press roller

16 Cam arm

19 Arm

20 Lift holder

21 Adjustable contact part

22 Brush arm

23 Reception part

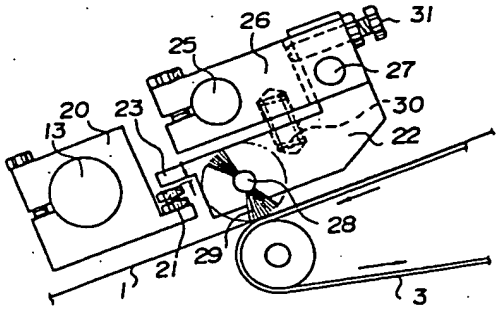
25 Support shaft

26 Arm bracket

29 Brush roller

30 Press spring

3 (a)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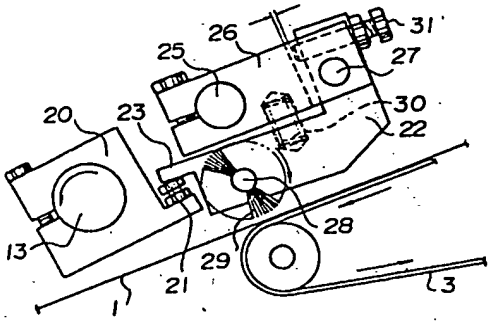
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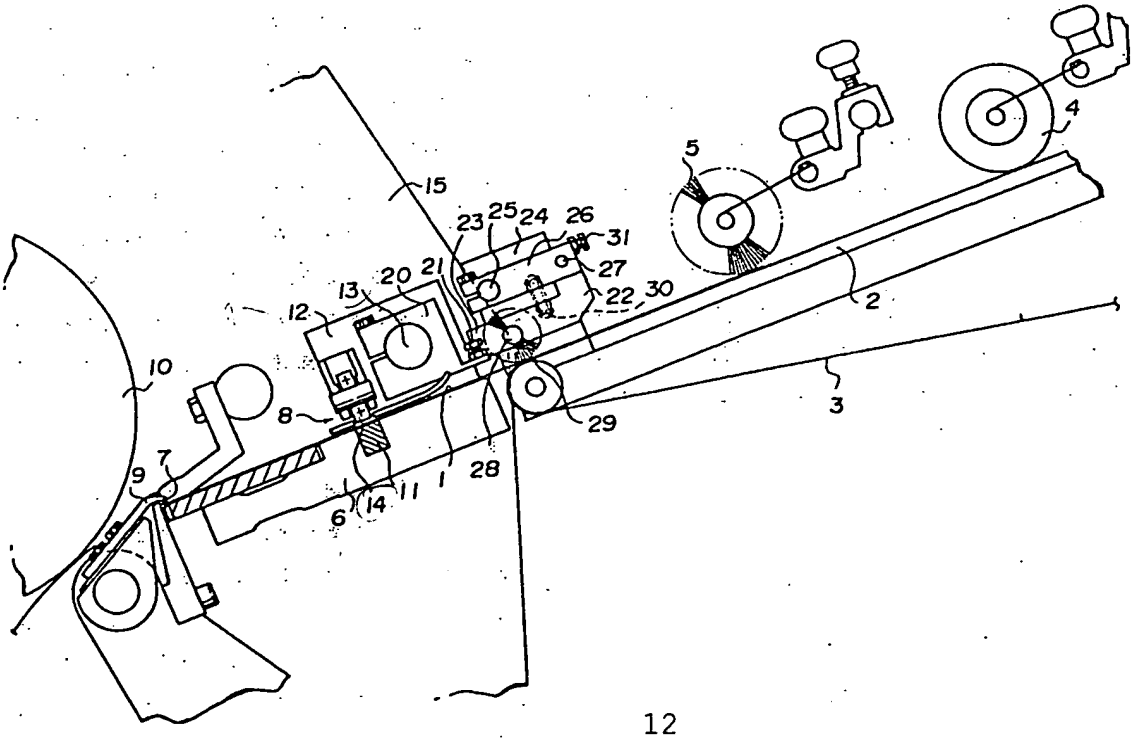
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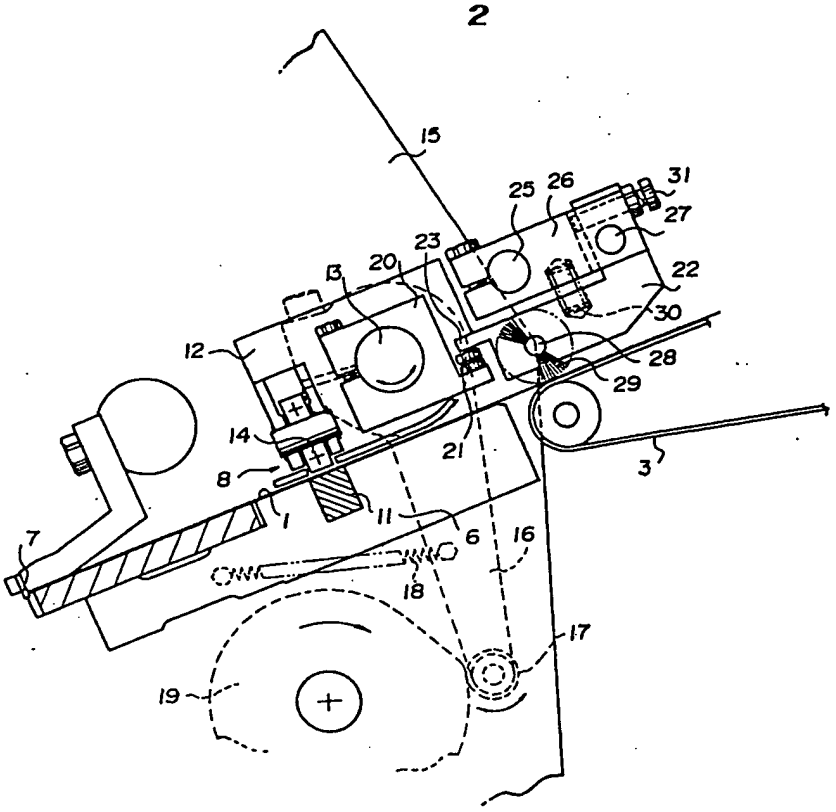
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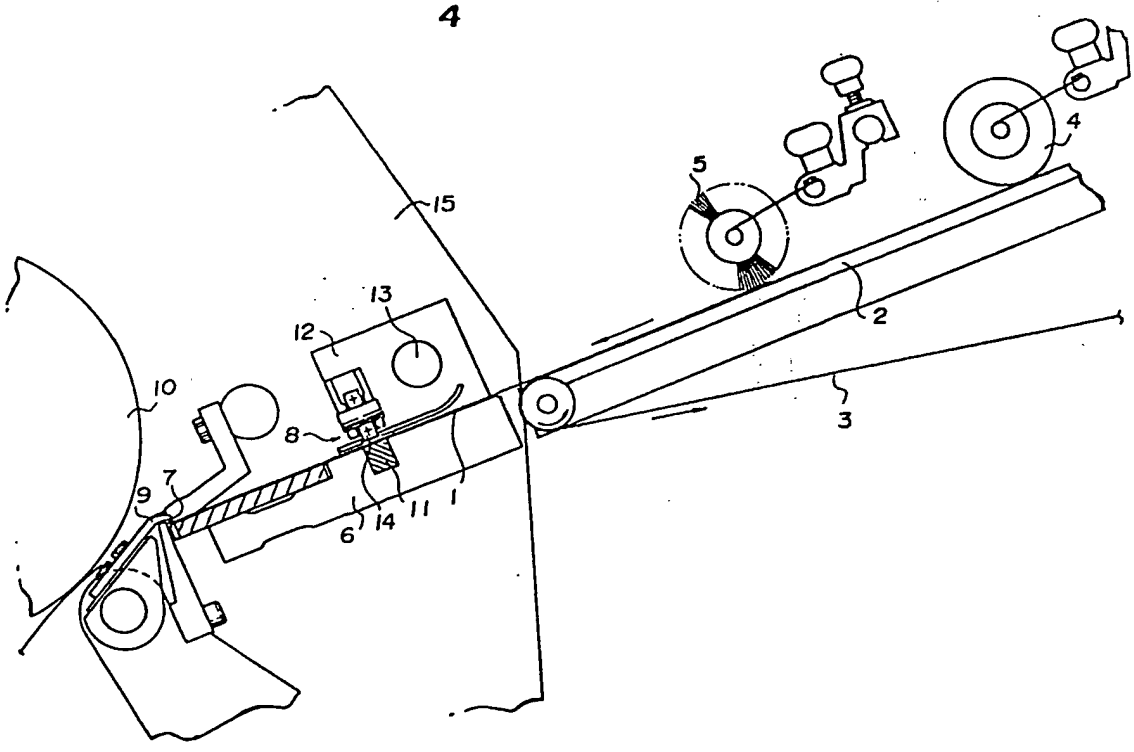
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